

CLAIMS

1. A method of maintaining synchronization among a plurality of network devices having local clocks that participate in a network comprising:

broadcasting a first packet from a first network device to other network devices that participate in the network wherein the first packet includes a global time reference derived from the local clock of the first network device; and

adjusting the clocks of the network devices that receive the first packet to be closer to the local clock of the first network device.

2. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 further including:

broadcasting a second packet from a second network device to other network devices that participate in the network wherein the second packet includes a global time reference derived from the local clock of the second network device; and

adjusting the clocks of the other network devices network devices that receive the second packet to be closer to the local clock of the second network device.

3. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein the global time reference includes the least significant part of the local clock of the first network device and does not include the most significant part of the local clock of the first network device.

4. A method of maintaining synchronization among a plurality of network devices as recited in claim 3 wherein the most significant part of one of the network device local clocks is broadcast periodically and the most significant parts of all local clocks are conformed to the broadcast most significant part.

5. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein adjusting the clocks of the network devices that receive the first packet to be closer to the local clock of the first network device includes adjusting the clocks of the network devices according to a linear function of the difference between the unadjusted value of the clock being adjusted and the broadcast global time reference.

6. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein adjusting the clocks of the network devices that receive the first packet to be closer to the local clock of the first network device includes adjusting the clocks of the network devices by approximately one half the difference between the broadcast global time reference and the unadjusted value of the clock being adjusted.

7. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein adjusting the clocks of the network devices that receive the first packet to be closer to the local clock of the first network device includes adjusting the clocks of the network devices according to a nonlinear function of the difference between the unadjusted value of the clock being adjusted and the broadcast global time reference.

8. A method of maintaining synchronization among a plurality of network devices as recited in claim 7 wherein the nonlinear function of the difference between the unadjusted value of the clock being adjusted and the broadcast global time reference causes substantially no adjustment to the clock being adjusted when the difference between the unadjusted value of the clock being adjusted and the broadcast global time reference is greater than a maximum adjustable difference.

9. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein the global time reference is derived from the local clock of the first network device immediately after a frame synchronization portion of a packet is transmitted.

10. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein adjusting the clocks of the network devices that receive the first packet to be closer to the local clock of the first network device includes comparing the local clock of a receiving network device at the instant that frame synchronization is detected to the transmitted global time reference.

11. A method of maintaining synchronization among a plurality of network devices as recited in claim 1 wherein all data packets broadcast by any network device that participates in the network includes a global time reference derived from the local clock

of the broadcasting network device so that as more data is transmitted, the local clocks of the receiving network devices are updated more frequently.

12. A method of maintaining a first network local time reference and a second network local time reference for a device that participates in a first network and a second network comprising:

- maintaining a free running clock on the device;
- determining the difference between the free running clock and a first network global time reference;
- calculating a first network offset to account for the difference between the free running clock and the first network global time reference;
- determining the difference between the free running clock and a second network global time reference; and
- calculating a second network offset to account for the difference between the free running clock and the second network global time reference.

13. A receiving network device configured to maintain synchronization with a transmitting network device comprising:

- a receiving network device local clock;
- an interface configured to receive a first packet from the transmitting network device wherein the first packet includes a global time reference derived from a transmitting network device local clock; and
- a processor configured to adjust the receiving network device local clock to be closer to the transmitting network device local clock.

14. A receiving network device configured to maintain synchronization with a transmitting network device as recited in claim 13 wherein the receiving network device local clock includes a free running clock and a free running clock offset.

15. A transmitting network device configured to maintain synchronization with a receiving network device comprising:

- a transmitting network device local clock;
- an interface configured to transmit a first packet wherein the first packet includes a global time reference derived from the transmitting network device local clock and

wherein the global time reference is used by the receiving network device to adjust the receiving network device local clock to be closer to the transmitting network device local clock.

16. A network of devices comprising:

a transmitting network device configured to transmit a first packet wherein the first packet includes a global time reference derived from a transmitting network device local clock; and

a receiving network device configured to receive the first packet from the transmitting network device and to adjust a receiving network device local clock to be closer to the global time reference.

17. A network device comprising:

a free running clock;

a processor configured to:

determine the difference between the free running clock and a first network global time reference;

calculate a first network offset to account for the difference between the free running clock and the first network global time reference;

determine the difference between the free running clock and a second network global time reference; and

calculate a second network offset to account for the difference between the free running clock and the second network global time reference.